

(12) UK Patent Application (19) GB (11) 2 356 910 (13) A

(43) Date of A Publication 06.06.2001

(21) Application No 0028476.0

(22) Date of Filing 22.11.2000

(30) Priority Data

(31) T099U0211 (32) 30.11.1999 (33) IT

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(51) INT CL⁷

F16H 57/12

(52) UK CL (Edition S)

F2Q Q7H1 Q7H4C

(56) Documents Cited

WO 97/43564 A DE 019513970 A US 5671636 A

(58) Field of Search

UK CL (Edition S) F2Q Q7H1 Q7H2A Q7H2B Q7H3
Q7H4A Q7H4B Q7H4C Q7H4D Q7H5A Q7H5B1
Q7H5B2 Q7H5C Q7H5D

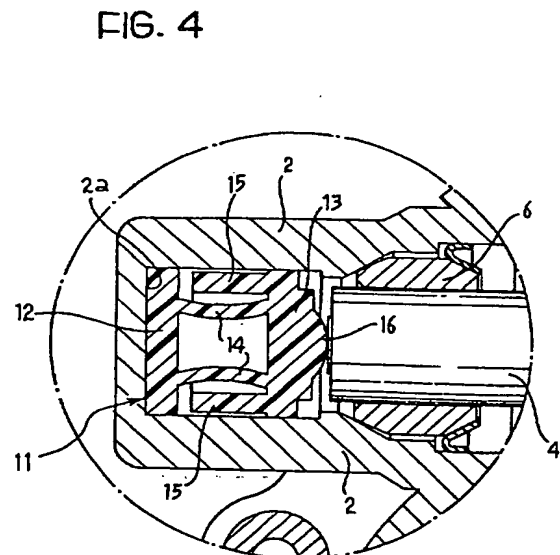
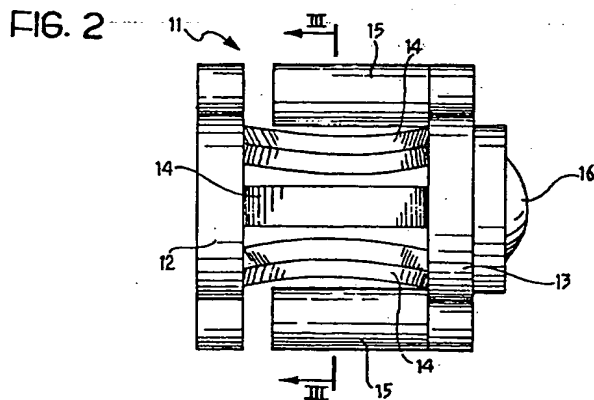
INT CL⁷ F16H 55/18 55/24 55/28 57/12

Online: WPI, JAPIO & EPODOC

(54) Abstract Title

Device for taking up axial play in a geared unit

(57) The device comprises a monolithic spacer body 11 including a first end portion 12 and a second end portion 13, spaced apart axially facing one another, and axially connected by a plurality of resilient deformable members 14 which allow the end portions 12, 13 to move towards one another when the spacer body 11 is subjected to an axial compression stress. The body 11 is intended to be interposed, in an axially loaded condition, between an end of the shaft 4 and a corresponding abutment 2a provided in the casing 2.



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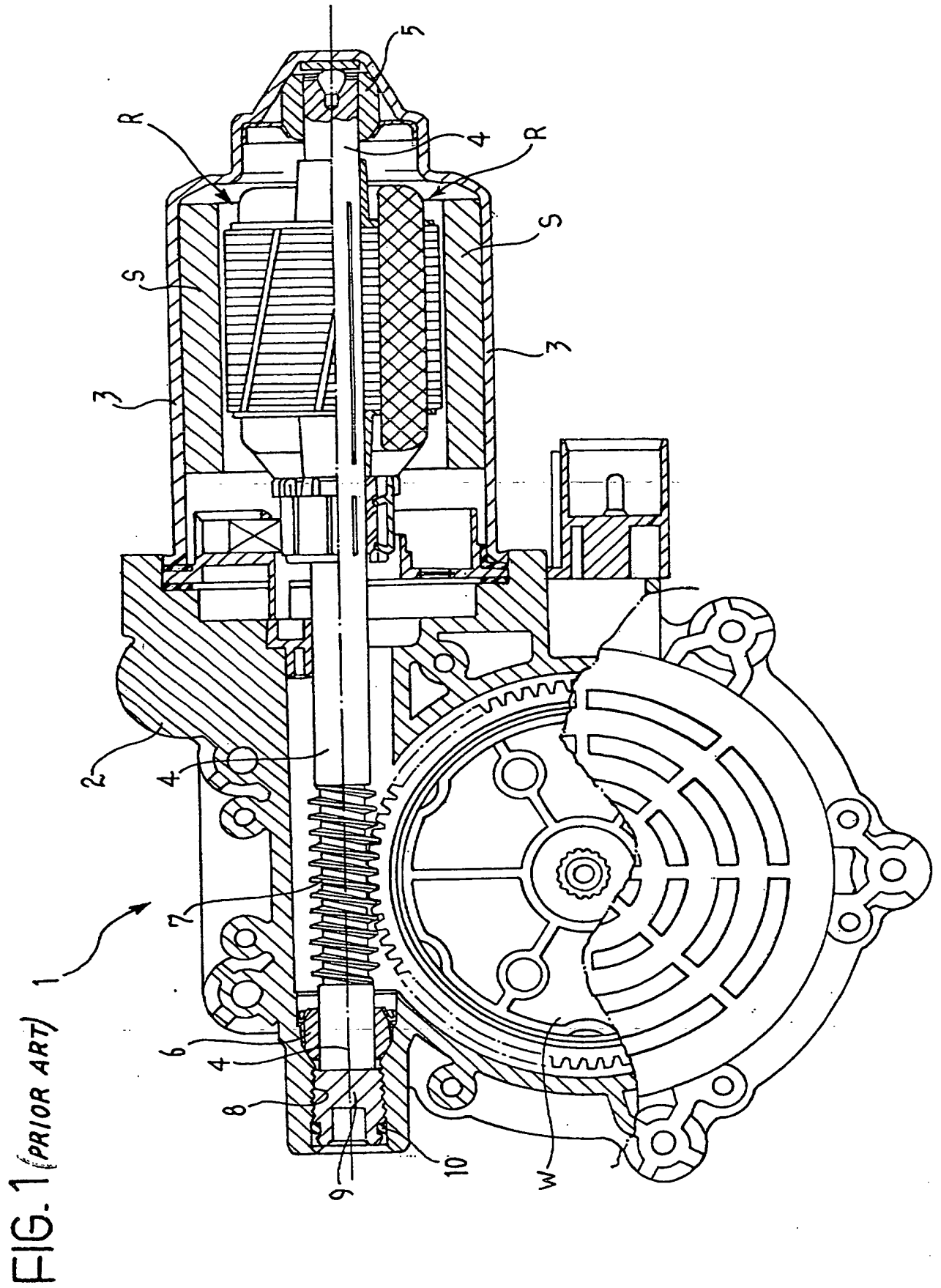


FIG. 2

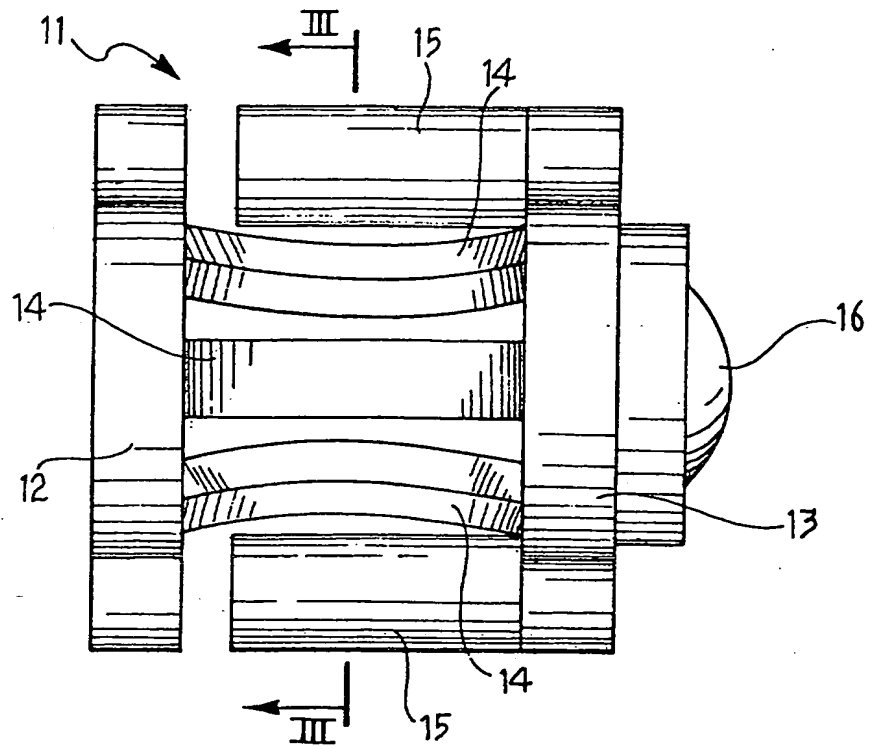


FIG. 3

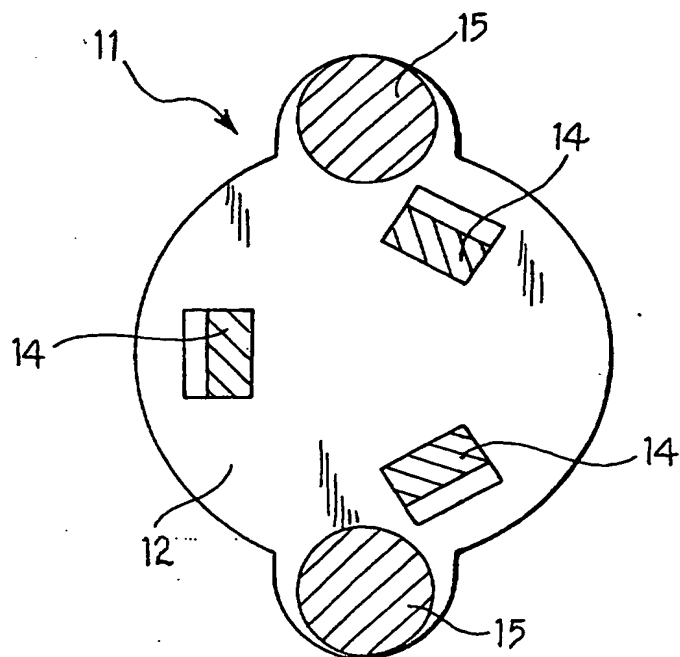


FIG. 4

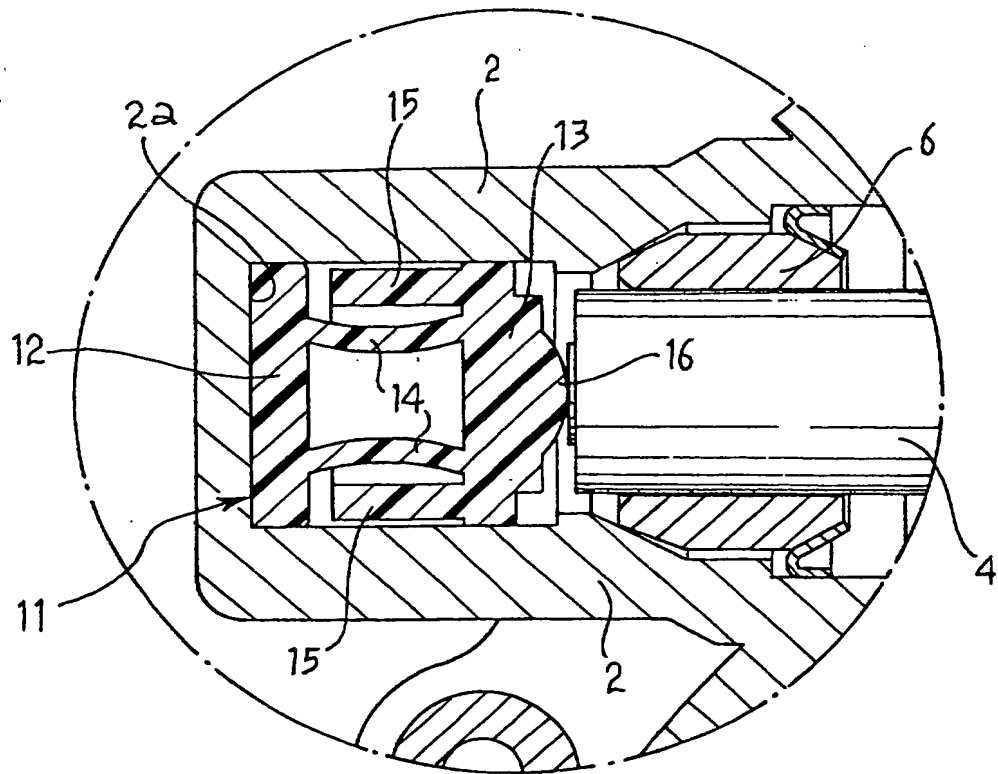


FIG. 5

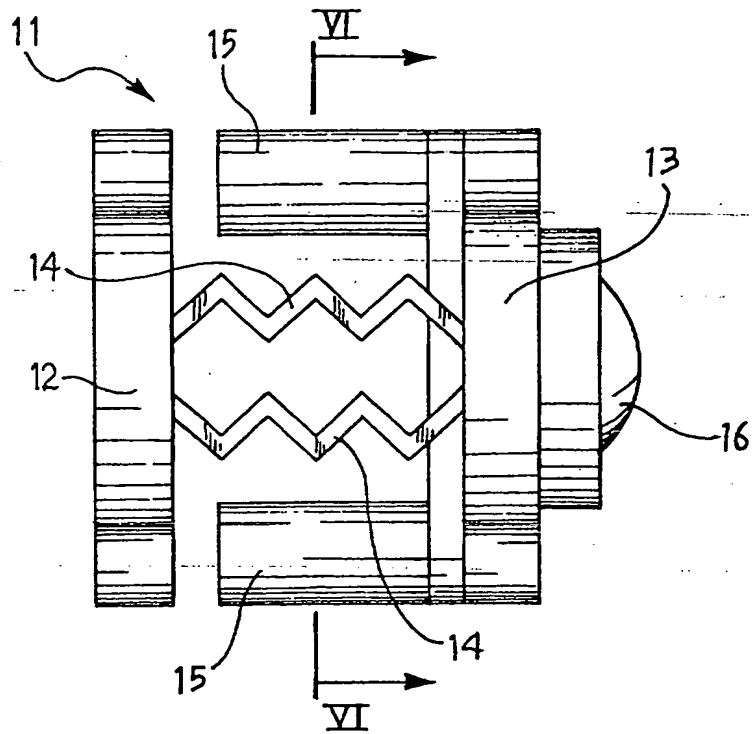
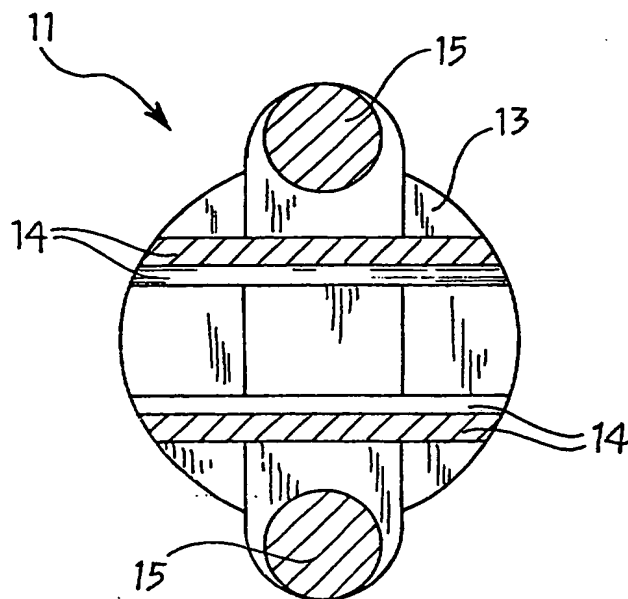


FIG. 6



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A device for taking up the axial play in a geared motor unit

The present invention relates to a device for taking up the axial play of the shaft of a geared motor unit relative to the support casing in which the shaft is mounted rotatably.

Figure 1 of the appended drawings is a partially-sectioned view of a geared motor unit according to the prior art. This geared motor unit 1 comprises, in known manner, a support casing formed by a shaped body 2 to which a substantially cup-shaped body is connected. The stator S of the electric motor of the geared motor unit is fixed in the cup-shaped body and the rotor R is mounted rotatably in the stator. The rotor is carried by a shaft 4 which has one end mounted rotatably in a bush-like bearing 5 housed in the end portion of the cup-shaped body 3. The other end of the shaft 4 is mounted rotatably in a further bearing bush 6 mounted in the body 2.

The portion of the shaft 4 which extends in the body 2 has a helical thread 7 so that the shaft acts as a worm screw in operation. The thread 7 of the shaft meshes with the teeth of a gear W with which it forms the gearing-down unit of the geared motor unit.

In the solution according to the prior art shown in Figure 1, a threaded opening 8 is formed in the vicinity of the end of the shaft 4 and a grub screw 9, preferably provided with a toric sealing ring 10, is screwed therein. The grub screw 9 bears against the end of the shaft 4. During assembly, in order to take up the axial play of the shaft 4 relative to the casing 2, 3 of the geared motor unit due to the manufacturing tolerances of the bodies 2 and 3 as well as of the shaft 4 itself, the position of the grub screw 9 has to be adjusted appropriately by manual operation or by a specific automated device.

This known solution is constructionally costly and operatively expensive.

An object of the invention is therefore to provide a device which enables the axial play between the shaft of a geared motor unit and the support casing in which the shaft is mounted rotatably to be taken up more easily, quickly and cheaply.

This and other objects are achieved, according to the invention, by a device the main characteristics of which are defined in appended Claim 1.

Further characteristics and advantages of the invention will become clear from the following detailed description given purely by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1, already described, shows a geared motor unit according to the prior art,

Figure 2 is a side view of a device according to the invention,

Figure 3 is a cross-section taken on the line III-III of Figure 2,

Figure 4 is a sectioned view showing a device according to the invention, on an enlarged scale, in the mounted condition of use,

Figure 5 is a side view of another device according to the invention, and

Figure 6 is a cross-section taken on the line VI-VI of Figure 5.

In Figures 2 to 4, a device according to the invention is generally indicated 11. The device comprises a monolithic body which is preferably made of a plastics material such as an acetal resin, and which has two substantially plate-shaped end portions 12 and 13. The portions 12 and 13 are spaced apart axially, face one another, and are interconnected axially by a plurality of resiliently deformable members 14. These interconnection members 14 allow the end portions 12 and 13 to move towards one another when the body 11 is subjected to an axial compression stress. In the embodiment of Figures 2 to 4, the interconnection members 14 have a shape which is curved in a transverse direction at rest, as can be seen in particular in Figure 2.

At least one, but preferably both of the end portions 12 and 13 of the body 11 have respective non-circular shapes so that they can be positioned in respective seats of

corresponding shape provided in the casing or body 2 of the geared motor unit in a manner such that rotation of the body 11 is prevented in the assembled condition.

As can be seen in particular in Figure 2, at least one and preferably two longitudinal appendages 15 extend from at least one of the two end portions of the spacer body 11 towards the other end portion of the body 11. These appendages 15 are of a length such that, at rest, their end faces are spaced from the other end portion of the body 11 whereas, in the condition of use, as will become clearer from the following, they can limit the movement of the end portions 12 and 13 towards one another to a predetermined value.

The spacer body 11 is shown in the mounted condition of use in Figure 4. As can be seen in this drawing, the spacer body 11 is arranged with its end portion 12 in abutment with a stop surface 2a of the body or support casing 2 which, with the use of the device according to the invention, no longer necessarily has to have the end opening 8 mentioned with reference to Figure 1.

In the mounted condition, the end portion 13 of the spacer body 11 faces the end of the shaft 4 of the geared motor unit. This end portion 13 advantageously has a rounded, convex end projection 16 which bears against the end of the shaft 4. This projection reduces both sliding friction and the current consequently absorbed by the electric motor of the geared motor unit, in operation.

In the mounted condition (Figure 4), the spacer body 11 is loaded axially but without the end faces of its appendages 15 being in contact with the end portion 12.

In operation, however, these appendages 15 can limit any axial travel of the shaft 4 of the geared motor unit.

Figures 5 and 6 show a variant. In these drawings, parts and elements already described have again been attributed the same reference numerals.

In the embodiment of Figures 5 and 6, the end portions 12 and 13 are interconnected by a plurality of resiliently deformable members 14 which have a longitudinally corrugated shape. Otherwise, both from the structural point of view and from the assembly point of view, the device 11 of Figures 5 and 6 corresponds substantially to the device described above with reference to Figures 2 to 4.

Naturally, the principle of the invention remaining the same, the forms of embodiment and details of construction may be varied widely with respect to those described and illustrated purely by way of non-limiting example, the invention extending to all embodiments which achieve equal utility by virtue of the same innovative concepts.

Claims

1. A device for taking up the axial play of the shaft (4) of a geared motor unit (1) relative to the support casing (2, 3) in which the shaft (4) is mounted rotatably,

characterized in that it comprises a monolithic spacer body (11) including a first substantially plate-like end portion and a second substantially plate-like end portion (12, 13) spaced apart axially, facing one another, and interconnected axially by a plurality of resiliently deformable members (14) which allow the end portions (12, 13) to move towards one another when the spacer body (11) is subjected to an axial compression stress, the body (11) being intended to be interposed, in an axially loaded condition, between an end of the shaft (4) and a corresponding abutment or stop surface (2a) provided in the casing (2, 3).
2. A device according to Claim 1 in which at least one of the end portions (12, 13) of the body (11) has a non-circular shape and can be positioned in a seat of corresponding shape provided in the casing (2, 3) in a manner such that rotation of the body (11) is prevented in the mounted condition.
3. A device according to Claim 1 or Claim 2 in which at least one longitudinal appendage (15) extends from at least one of the end portions (12, 13) of the body (11) towards the other end portion (13, 12) of the body (11) and has an axial length such that it can limit the movement of the end portions (12, 13) towards one another to a predetermined value.
4. A device according to any one of the preceding claims in which the interconnection members (14) have a shape which is curved in a transverse direction at rest.
5. A device according to any one of Claims 1 to 3 in which the interconnection members (14) have a longitudinally corrugated shape.

6. A device according to any one of the preceding claims, characterized in that the end portion (13) which is intended to face the shaft (4) of the geared motor unit (1) has a rounded and convex end projection (16) for bearing against the end of the shaft (4).
7. A device according to any one of the preceding claims, characterized in that the body (11) is made of a plastics material, preferably an acetal resin.
8. A device for taking up the axial play of the shaft of a geared motor unit relative to the support casing in which the shaft is rotatably mounted, substantially as herein described with reference to and illustrated in any of Figures 2 to 6 of the accompanying drawings.



Application No: GB 0028476.0
Claims searched: 1 to 8

Examiner: Jason Clee
Date of search: 14 March 2001

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): F2Q

Int Cl (Ed.7): F16H: 55/18, 55/24, 55/28 & 57/12

Other: Online: WPI, EPODOC & JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	WO 97/43564 A (Rockwell Light Vehicle Systems & Meritor Light Vehicle Systems)	-
A	US.5671636 (Heidelberg Harris Inc.)	-
A	DE 19513970 A (Webasto Karosseriesysteme GmbH)	-

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